CLAIMS

What is claimed is:

1. A method for searching for an optimal solution to an optimization problem using a
2   computer-implemented process based on a genetic model, comprising:

         generating, during each of a series of generations of the computer-
4   implemented process, a set of child chromosomes, each child chromosome
         comprising at least one gene;

6   examining the child chromosomes for undesirable gene combinations;

         altering the undesirable gene combinations to produce a set of
8   putatively corrected child chromosomes; and

         evaluating the fitness as the optimal solution of each of the putatively
10   corrected child chromosomes prior to updating a chromosome pool for use in
         the successive generation.

2. The method of claim 1, wherein the undesirable gene combinations are identified
2   based on a priori knowledge of constraints on the optimization problem.

3. The method of claim 1, wherein the undesirable gene combinations are identified
2   by use of a statistical technique.

4. The method of claim 3, wherein the statistical technique comprises training a
2   neural network on at least one gene subset within the child chromosomes.

5. The method of claim 1, wherein the undesirable gene combinations are identified

2   based on a combination of a priori knowledge of constraints on the optimization

   problem and the use of a statistical technique.

6. The method of claim 1, wherein altering the undesirable gene combinations to

2   produce a set of putatively corrected child chromosomes comprises

   deterministically altering at least one undesirable gene combination based on a

4   priori knowledge of constraints on the optimization problem.

7. The method of claim 1, wherein altering the undesirable gene combinations to

2   produce a set of putatively corrected child chromosomes comprises randomly

   altering at least one undesirable gene combination.

8. The method of claim 1, wherein altering the undesirable gene combinations to

2   produce a set of putatively corrected child chromosomes comprises altering at

   least one undesirable gene combination in accordance with a greedy optimization.

9. The method of claim 1, wherein the optimization problem comprises optimizing at

2   least one characteristic of an integrated circuit.

10. A method for searching for an optimal solution to an optimization problem using a

2   computer-implemented process based on a genetic model, comprising:

      representing candidates for the optimal solution as a chromosome pool,

4   each chromosome in the chromosome pool comprising at least one gene; and

6   performing the following steps iteratively during each of a series of generations until a chromosome is determined to be the optimal solution to the optimization problem:

8   generating, through a reproduction process, a set of child chromosomes,

10   assigning a fitness score to each child chromosome,

     examining the child chromosomes for undesirable gene

12   combinations,

     altering the undesirable gene combinations to produce a set of

14   putatively corrected child chromosomes,

     assigning an updated fitness score to each putatively corrected

16   child chromosome, and

     updating the chromosome pool for the successive generation.

11. The method of claim 10, wherein the undesirable gene combinations are identified

2   based on a priori knowledge of constraints on the optimization problem.

12. The method of claim 10, wherein the undesirable gene combinations are identified

2   by use of a statistical technique.

13. The method of claim 12, wherein the statistical technique comprises training a

2   neural network on at least one gene subset within the child chromosomes.

14. The method of claim 10, wherein the undesirable gene combinations are identified

2   based on a combination of priori knowledge of constraints on the optimization

problem and the use of a statistical technique.

15. The method of claim 10, wherein altering the undesirable gene combinations to

2   produce a set of putatively corrected child chromosomes comprises

deterministically altering at least one undesirable gene combination based on a

4   priori knowledge of constraints on the optimization problem.

16. The method of claim 10, wherein altering the undesirable gene combinations to

2   produce a set of putatively corrected child chromosomes comprises randomly

altering at least one undesirable gene combination.

17. The method of claim 10, wherein altering the undesirable gene combinations to

2   produce a set of putatively corrected child chromosomes comprises altering at

least one undesirable gene combination in accordance with a greedy optimization.

18. The method of claim 10, wherein the optimization problem comprises optimizing

2   at least one characteristic of an integrated circuit.

19. A system programmed to perform the following method:

2   generating, during each of a series of generations of a computer-

implemented process based on a genetic model for solving an optimization

4   problem, a set of child chromosomes, each child chromosome comprising at

least one gene;

6   examining the child chromosomes for undesirable gene combinations;

altering the undesirable gene combinations to produce a set of

8   putatively corrected child chromosomes; and

evaluating the fitness as a solution to the optimization problem of each

10   of the putatively corrected child chromosomes prior to updating a

chromosome pool for use in the successive generation.

20. The system of claim 19, wherein the system comprises a plurality of networked

2   processing nodes.

21. A system programmed to perform the following method:

2   representing candidates for an optimal solution to an optimization

problem as a chromosome pool, each chromosome in the chromosome pool

4   comprising at least one gene; and

performing the following steps iteratively during each of a series of

6   generations of a process based on a genetic model until a chromosome is

determined to be the optimal solution to the optimization problem:

8   generating, through a reproduction process, a set of child

chromosomes,

10   assigning a fitness score to each child chromosome,

examining the child chromosomes for undesirable gene

12   combinations,

altering the undesirable gene combinations to produce a set of

14   putatively corrected child chromosomes,

assigning an updated fitness score to each putatively corrected

16   child chromosome, and

updating the chromosome pool for the successive generation.

22. The system of claim 21, wherein the system comprises a plurality of networked

2   processing nodes.

23. A system for searching for an optimal solution to an optimization problem using a

2   computer-implemented process based on a genetic model, comprising:

means for generating, during each of a series of generations of the

4   computer-implemented process, a set of child chromosomes, each child

chromosome comprising at least one gene;

6   means for examining the child chromosomes for undesirable gene

combinations;

8   means for altering the undesirable gene combinations to produce a set

of putatively corrected child chromosomes; and

10   means for evaluating the fitness as the optimal solution of each of the

putatively corrected child chromosomes prior to updating a chromosome pool

12   for use in the successive generation.

24. A computer-readable storage medium containing program code to solve an

2   optimization problem according to a process based on a genetic paradigm,

comprising:

4   a first code segment configured to generate, during each of a series of

generations of the process, a set of child chromosomes, each child

6   chromosome comprising at least one gene;

    a second code segment configured to examine the child chromosomes

8   for undesirable gene combinations;

    a third code segment configured to alter the undesirable gene

10   combinations to produce a set of putatively corrected child chromosomes; and

    a fourth code segment configured to evaluate the fitness as a solution

12   to the optimization problem of each of the putatively corrected child

chromosomes prior to updating a chromosome pool for use in the successive

14   generation.